IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	)	
	)	
Kevin M. McHugh	)	
	)	
Serial No. 09/592,003	)	Examiner: Leyson
	)	
Filed 06/12/00	)	Group Art Unit: 1722
	)	
Atty. Dkt.: EGG-PI-612A1a	)	
	)	
For: Rapid Solidification Processing System for Producing Molds, Dies and Related Tooling	)	

6/KW 2/5/02

Assistant Commissioner for Patents
Washington, D.C. 20231
Attention: Official Draftsman

SUBSTITUTE DRAWINGS REQUEST

Please enter the enclosed substitute drawing sheet 5 in the above-referenced application in place of the originally filed drawing sheet. The substitute drawing sheet 5 is being submitted to correctly label Fig.s 4A, 4B and 4C that were inadvertently mislabeled in the drawing sheet as originally filed. A red-inked copy of drawing sheet 5 showing correctly labeled figures is

CERTIFICATE OF MAILING/TRANSMISSION (37 CFR 1.8a)

I hereby certify that this correspondence is, on the date shown below, being:

MAILING

[X] deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to the Assistant Commissioner for Patents, Washington D.C. 20231

Date: February 14, 2002

FACSIMILE

[ ] transmitted by facsimile to the Patent and Trademark Office.

MANDY LANDON
(Type or print name of person certifying)

Signature

submitted along with the formal drawing sheet 5. No new matter is contained in the new drawing sheet.

Acknowledgment of receipt of the formal drawing sheet and its acceptance into the file is requested.

RESPECTFULLY SUBMITTED,

By _____

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Date 1/30/02

Enclosures: Substitute Formal Drawing Sheet 5; Red-inked copy of Drawing Sheet 5.

Nozzle Information

• Nozzle Information:	14.0°
• Exit Angle	14.0°
• Distance from Liquid Orifice to Nozzle Exit (inches)	1.018
• Number of Orifices	6.0
• Orifice Area (square inches)	0.000314
• Total Area of Liquid Orifices (square inches)	0.0019
• Cross Sectional Area of Nozzle Throat (square inches)	0.06
• Cross Sectional Area of Gas Stream at Nozzle Exit (square inches)	0.266

Fig. 4A

Run Time (sec)	TC #1 (°C)	TC #2 (°C)	TC #3 (°C)	TC #4 (°C)	TC #5 (°C)	TC #6 (°C)	Argon TC #7 (°C)	Gas Flow (slpm)
45.5	309.7	165.3	107.7	100.6	86.0	79.5	74.8	253.7
105.5	318.8	190.5	122.6	113.5	92.9	83.9	79.1	283.6
165.5	318.0	199.0	129.8	120.1	97.3	87.0	81.6	305.8
215.5	324.6	201.3	134.5	124.8	101.0	90.0	83.9	329.5
285.5	311.7	200.0	136.0	127.0	102.5	91.1	85.2	355.9
345.5	295.9	196.6	135.3	127.0	102.5	90.6	84.6	381.2
405.5	279.9	194.4	135.1	127.2	102.9	91.2	85.1	412.2
465.5	266.9	190.6	133.4	126.2	101.9	90.6	84.1	439.3
525.5	251.8	186.0	131.9	125.4	101.4	90.1	84.2	474.7
585.5	233.4	180.1	130.3	123.8	100.4	89.5	83.7	504.5
Distance from Nozzle Exit (inches)								
	0.125	1.25	2.25	3.25	4.375	5.312	6.187	

Fig. 4B

Gas Temperature Nozzle Inlet (°C)	Nozzle Temperature Liquid Orifice (°C)	Chamber Temperature (°C)	Nozzle Inlet Pressure (psia)
552.7	347.9	38.0	15.096
555.8	356.7	39.0	16.168
557.2	362.7	39.7	17.074
548.5	365.0	40.0	18.020
527.3	364.1	41.1	19.003
501.7	359.3	41.9	19.926
476.0	350.9	42.0	20.982
453.9	340.9	43.4	21.928
429.2	329.3	44.0	23.054
409.0	317.4	44.1	23.968

Fig. 4C

Nozzle Information

• Nozzle Information:	14.0°
• Exit Angle	14.0°
• Distance from Liquid Orifice to Nozzle Exit (inches)	1.018
• Number of Orifices	6.0
• Orifice Area (square inches)	0.000314
• Total Area of Liquid Orifices (square inches)	0.0019
• Cross Sectional Area of Nozzle Throat (square inches)	0.06
• Cross Sectional Area of Gas Stream at Nozzle Exit (square inches)	0.266

Fig. 4A

Run Time (sec)	TC #1 (°C)	TC #2 (°C)	TC #3 (°C)	TC #4 (°C)	TC #5 (°C)	TC #6 (°C)	Argon TC #7 (°C)	Gas Flow (slpm)
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585.5	233.4	180.1	130.3	123.8	100.4	89.5	83.7	504.5
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	0.125	1.25	2.25	3.25	4.375	5.312	6.187	

Fig. 4B

Gas Temperature Nozzle Inlet (°C)	Nozzle Temperature Liquid Orifice (°C)	Chamber Temperature (°C)	Nozzle Inlet Pressure (psia)
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555.8	356.7	39.0	16.168
557.2	362.7	39.7	17.074
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527.3	364.1	41.1	19.003
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476.0	350.9	42.0	20.982
453.9	340.9	43.4	21.928
429.2	329.3	44.0	23.054
409.0	317.4	44.1	23.968

Fig. 4B